THE EFFECT OF TONSILLECTOMY ON THE OCCURRENCE AND COURSE OF ACUTE POLYARTHRITIS.

Analysis of 654 consecutive case histories.

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The problem of focal infection and its relation to the etiology of rheumatic diseases and their recurrence has been much studied and discussed in recent years. Recent work upon the bacteriological and immunological aspects of rheumatic diseases has emphasized the importance of this concept and most writers have stressed the rôle of the tonsils as an important focus. The object of this paper is to consider the various aspects concerning this possible source of systemic infection.

Tonsillitis, acute or chronic, is a medical disease and as such is usually entirely under the direction of the general practitioner. Even in the eventuality of tonsillectomy the patient is urged or dissuaded according to the beliefs or doubts of his medical adviser.

The virulence of a given attack of tonsillitis is difficult to estimate. A seemingly mild tonsillitis may have dire effects upon other structures while a much more violent local reaction may pass, leaving little but weakness and prostration and followed by apparently complete recovery. The physician has little difficulty in recognizing an attack of acute tonsillitis. The diagnosis of the chronic form may be more difficult. Slight degrees of sore throat may make but little impression on the patient's mind and he may fail to mention them in giving his medical history, or they have not recurred for so many years that they are entirely forgotten. In attempting to explain undefined ill health, the physician should take into consideration a history of previous sore throats, for the tonsils once infected, even though

quiescent for years, have proved in numerous cases to still harbor infection.

It has been shown[1] that the tonsils may be enucleated with safety during the acute stage of rheumatic fever. The present study was made to determine, if possible, whether or not the enucleation of the tonsils at any time has any effect upon the course and recurrence of rheumatic fever. Since our material is based entirely upon the examination of case histories, no great emphasis can be laid upon the accuracy of details. The results, however, have brought out interesting comparisons and observations.

For the purposes of this study 654 consecutive cases were taken from the four medical services of the Boston City Hospital during a five-year period between January 1, 1924, and December 31, 1928. Such a period was chosen to avoid, if possible, annual fluctuations in the occurrence of rheumatic diseases and in the type of manifestations. In order to limit the size of the study and to secure an easily segregated and clean-cut group of cases, only those admitted for acute migratory polyarthritis were selected. Any suspected of having specific etiology or who later developed permanent changes in the joints were excluded. Of a total of 654 cases thus obtained, 114 had been operated upon for tonsillectomy previous to admission. Our attention was directed chiefly to tonsillectomy and its results since the medical treatment was essentially the same in all. The latter consisted primarily of large doses of salicylates or their substitutes when the former were not well tolerated. In addition to determining the efficacy of tonsillectomy in the various aspects of the disease, other interesting observations were thought worthy of recording as they have brought out points not commonly appreciated.

Analysis of Case Histories.

Age and Sex Distribution. The distribution of the cases according to decade and among the sexes is shown in Table I,

[1] Robey William H., and Finland, Maxwell: Arch. Int. Med., May, 1930, 45, 772.

TABLE I.

AGE AND SEX INCIDENCE.

Age (years)	Males	Females	Males and Females	Per Cent of Total
12-19	90	65	155	23.7
20-29	97	90	187	28.6
30-39	87	54	141	21.5
40-49	61	43	104	15.9
50 and over	44	23	67	10.2
All Ages	379	275	654	100.

and the percentage incidence of cases in the various decades, when allowance is made for the fact that no patients are admitted to the regular medical wards before the age of 12, shows a progressive decline with increasing age. There is also a predominance of males, approximately in the proportion of three to two. The predominance of males may be in part accounted for by the character of the hospital population. This, however, was not analyzed in detail. It is interesting to observe the large number of persons in the older age groups, a fact not commonly appreciated. The figures in some of the later tables are also arranged according to decades in order to emphasize the similarity of the various details of the disease in the later as well as in the earlier decades.

Incidence of Recurrences. In the group of 654 cases studied, 335 were admitted for an initial attack and the remaining 319 cases or 49% were admitted for recurrences. The percentage of cases in each age group with previous attacks of polyarthritis is strikingly uniform (Table II).

TABLE II.

FREQUENCY OF PREVIOUS ATTACKS OF ACUTE POLYARTHRITIS.

Age Group	Cases in Age Group	Cases with Previous Polyarthritis	Per Cent of Age Group
12-19	155	72	46.5
20-29	187	89	47.6
30-39	141	65	46.1
40-49	104	50	48.1
50 and over	67	43	64.2
All Ages	654	319	48.8

TABLE III.

FREQUENCY OF HISTORY OF RECURRENT ATTACKS OF POLYARTHRITIS IN CASES PREVIOUSLY SUBJECTED TO TONSILLECTOMY.

Age Group (years)	Cases in Age Group	Cases with Previous Tonsillectomy: Total Cases	Per Cent of Age Group	Admitted for Initial Attack	Per Cent of Age Group	Admitted for Recurrence	Per Cent of Age Group
12-19	155	58	36.7	25	16.1	33	20.6
20-29	187	34	18.2	12	6.4	22	11.8
30-39	141	18	12.7	5	3.5	13	9.2
40-49	104	4	3.8	0	0	4	3.8
50 and over	67	0	0	0	0	0	0
All Ages	654	114	17.4	42	6.4	72	11.0

Recurrences in Relation to Previous Tonsillectomies. In Table III are shown the numbers and percentages of patients in each of the various decades who were admitted for initial or subsequent attacks of acute migratory polyarthritis, and who had been previously subjected to tonsillectomy. It is seen that 42 or 6.4% of all the cases were admitted for an initial attack following tonsillectomy. Seventy-two cases or 11% were admitted for subsequent attacks following tonsillectomy, giving a total of 114 cases or 17.4% of a total of 654 cases admitted for acute polyarthritis subsequent to tonsillectomy. In other words, of the 335 patients admitted for an initial attack, 42 or 13% had previously had tonsillectomy, whereas 72 or 23% of the 319 cases admitted for recurrences previously had tonsillectomy. Thus twice the percentage of cases previously subjected to operation were admitted for a recurrence as were admitted for an initial attack. The proportion is quite similar in each of the age groups.

Frequency of Sore Throat in Relation to Tonsillectomy. In this category were included all cases who had sore throats diagnosed "septic throat" or "acute tonsillitis" or "acute pharyngitis" or similar diagnoses, in which the throat symptoms began either with the onset of the joint symptoms or preceded them by a period not exceeding 14 days. There were in all 281 cases or 43% having sore throats with or before the attack. Of the 114 cases who had previously had a tonsillectomy, 50 or 44% began with sore throats, whereas 231 or 43% of the 540 cases not previously subjected to the operation had an antecedent sore throat. It would appear that the attack

of acute polyarthritis was just as frequently preceded by throat symptoms in the group subjected some time previously to the operation, as in those who had never been operated upon. In this same connection, it is interesting to note that 50 or 44% of the 114 cases who had had their tonsils removed before entry, were found to have tonsillar tissue on simple inspection of the throat during the admission physical examination.

Frequency of Rheumatic Heart Disease. The frequency with which a diagnosis of rheumatic heart disease was made or suspected at the time of entry in the present group of cases is shown in Table IV. It is seen that 67 or 59% of the 114 cases previously operated upon had or were suspected of having heart involvement at the time of entry. Among the cases who had no previous operation, 202 or 37% had or were suspected of having rheumatic heart disease on admission to the hospital. This makes a total of 269 or 41% of all of the cases with heart lesions diagnosed or suspected at entry. Among these cases heart lesions were therefore about one and one-half times as frequent in those whose tonsils had been removed as they were in those not subjected to the operation.

TABLE IV.

FREQUENCY WITH WHICH THE DIAGNOSIS OF "RHEUMATIC HEART DISEASE" WAS MADE OR SUSPECTED AT THE TIME OF ADMISSION.

	Cases without Previous Tonsillectomy			Cases with Previous Tonsillectomy			All Cases		
Age (years)	Cases in Age Group	R.H.D. Diagnosed	R.H.D. Suspected	Cases in Age Group	R.H.D. Diagnosed	R.H.D. Suspected	Cases in Age Group	R.H.D. Diagnosed and Suspected	Per Cent of Age Group
12-19 . .	97	28	26	58	25	11	155	90	58
20-29 . .	153	32	25	34	15	7	187	79	42
30-39 . .	123	15	16	18	4	4	141	39	27
40-49 . .	100	21	10	4	1	0	104	32	31
50 and over	67	15	14	0	0	0	67	29	43
All Ages .	540	111	91	114	45	22	654	269	41

When analyzed according to whether the patients were admitted for the first or for a subsequent attack, it was seen that 92 or 29% of the 319 cases admitted for the first attack had had or were suspected of having heart involvement at the time of entry as compared to 175 or 52% of the 335 cases admitted for a recurrent attack who

were similarly affected. In other words, rheumatic heart disease was about twice as frequent in the group of cases admitted for recurrent attacks as among those admitted for an initial attack. Considering both of these findings it may be said that previous tonsillectomy had no striking effect in reducing the incidence of cardiac lesions at the time of admission to the hospital in this series of cases.

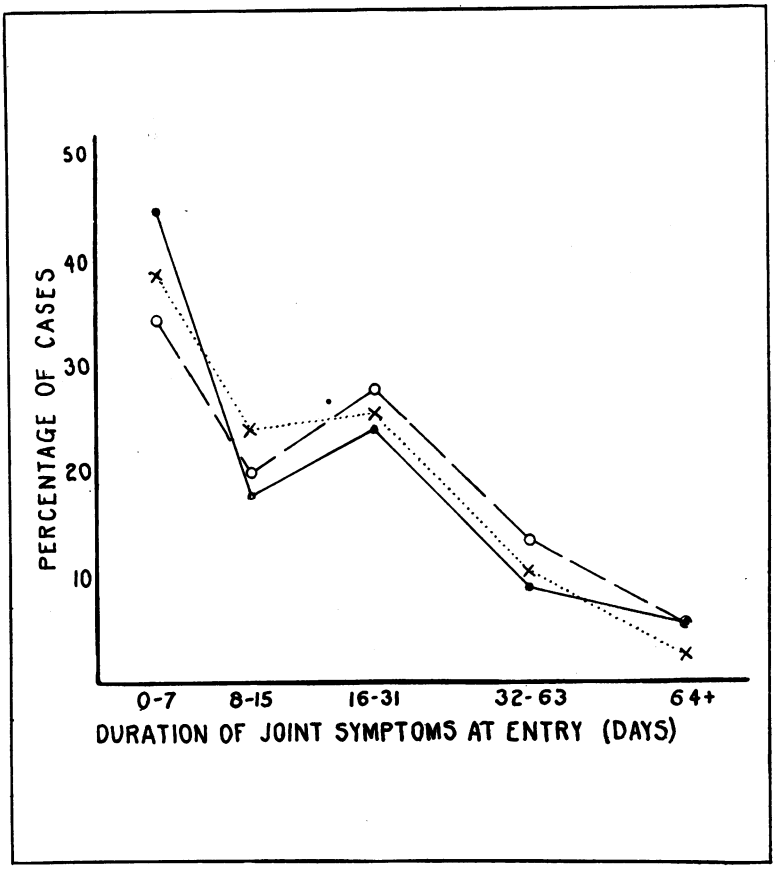

FIGURE 1.

●——————● Cases with tonsillectomy before admission.
O— — — — O Cases having tonsillectomy in hospital.
×·····× Cases without tonsillectomy.

Effect of Tonsillectomy on the Attack.

For purposes of comparing the cases which had never been subjected to tonsillectomy with those admitted subsequent to the operation and also with those subjected to tonsillectomy during their stay in the hospital, it was necessary to chose certain criteria which were both simple and easy to determine from the case records. Three such facts were chosen:

1. The duration of joint symptoms.
2. The duration of fever.
3. The duration of hospitalization.

Fever was considered present when the temperature rose to or above 99.4° F. In order to ascertain whether or not the cases were comparable at the time of admission to the hospital, the only criterion that could be used was the first, namely, the duration of joint symptoms at the time of admission, this being the most reliable symptom obtainable from the patient.

Duration of Joint Symptoms at Entry. In Table V is shown the duration at the time of entry of the joint symptoms in the cases studied. These were subdivided into groups according to the duration of symptoms and the patients divided further into those previously operated upon, those operated upon in the hospital, and those having no operation. The percentage incidence in each of the latter groups is indicated in the table shown graphically in Figure 1. From this figure it may be seen that the groups were quite comparable with regard to the duration of joint symptoms at the time of entry, the curves for each of these groups running closely together and crossing frequently.

TABLE V.

DURATION OF JOINT SYMPTOMS AT ENTRY.*

Duration at Entry (days)	Operated Before Admission		Operated During Hospitalization		Not Operated	
	Number of Cases**	Per Cent Distribution	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution
0-7	51	44.7	52	34.2	151	38.4
8-15	20	17.5	30	19.7	94	23.9
16-31	27	23.8	42	27.6	99	25.2
32-62	10	8.8	20	13.2	40	10.2
64*	6	5.3	8	5.3	9	2.3
All Cases	114	100.	152	100.	393	100.

*Cases where data were not given are excluded here and in the following tables.
**Including cases re-operated during hospitalization.

Total Duration of Joint Symptoms. The cases were analyzed in a similar manner with regard to the total duration of symptoms from the time of onset to the time when the joint symptoms were last noted, and the results are shown in Table VI and represented graphically in Figure 2. From a study of the latter figure, it appears that the cases previously subjected to tonsillectomy, as indicated by the solid line connecting the dots, and the cases having no operation, as represented by the dotted line connecting the crosses, were quite comparable with respect to the total duration of the joint symptoms, inasmuch as these curves are not widely divergent and cross early and again later. On the other hand, the cases that were operated upon in the hospital, indicated by the interrupted line connecting the circles, have a lower incidence among the groups having a short duration and a slightly higher incidence among those having a longer duration of joint symptoms. This does not appear very strikingly, but is definitely suggestive. It is, however, quite comprehensible if we consider that a number of cases who were operated upon during a period when they were not having joint symptoms had a recrudescence of symptoms subsequent to the operation.

TABLE VI.

TOTAL DURATION OF JOINT SYMPTOMS.

Duration (days)	Operated Before Admission		Operated During Hospitalization		Not Operated	
	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution
15 or less	33	29.2	26	16.9	95	25.3
16-30	29	25.7	45	20.9	122	32.5
31-60	33	29.2	52	37.8	122	32.5
61-90	8	7.1	19	12.3	25	6.7
91 or more	10	8.9	11	7.1	11	2.9
All Cases	113	100.	154	100.	375	100.

Duration of Fever in the Hospital. The cases were studied with respect to the total number of days of elevated temperature above 99.4° F., and the results tabulated in a manner similar to that in which the joint symptoms were studied. The results are shown in Table VII and represented graphically in Figure 3. The three curves in this figure are of the same form and run very close together, showing that with respect to the duration of fever in the hospital

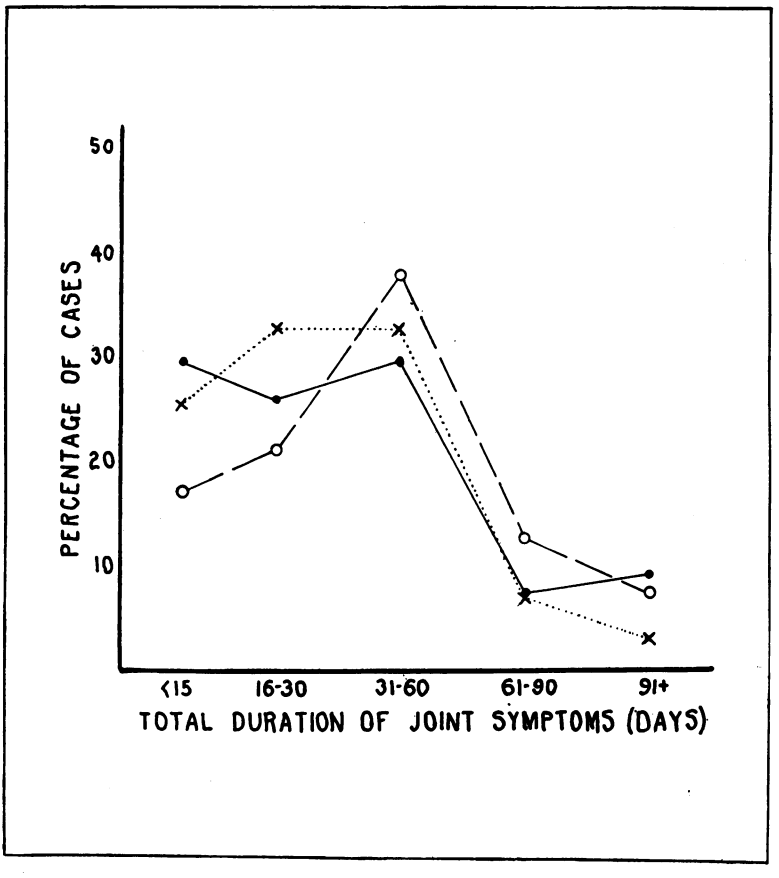

FIGURE 2.

●———● Cases with tonsillectomy before admission.
O— — — O Cases having tonsillectomy in hospital.
×·····× Cases without tonsillectomy.

there was very little difference beween those patients having no tonsillectomy, those subjected to this operation before entry, and those operated upon in the hospital.

TABLE VII.

DURATION OF FEVER IN THE HOSPITAL.

Duration (days)	Operated Upon Before Admission		Operated Upon During Hospitalization		Not Operated Upon	
	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution
0-7	80	70.1	107	68.1	289	72.8
8-15	15	13.2	30	19.1	54	13.6
16-30	13	11.4	14	8.9	40	10.1
31	6	5.3	6	3.8	14	3.5
All Cases	114	100.	157	100.	397	100.

Duration of Hospitalization. A similar study was made of the duration of hospitalization in these cases, and the results are shown in Table VIII and Figure 4. Here we see a progressive change in the shape of the curves, the curve representing the cases who had no tonsillectomy at all having the smallest percentage of cases in the shorter periods, and the greater percentage of cases in the longer periods. The cases subjected to tonsillectomy during the stay in the hospital have the lowest percentage in the shorter periods of hospitalization and the highest in the longer periods. The patients subjected to tonsillectomy before entry to the hospital occupy an intermediate position. In other words, the patients who had no tonsillectomy at all had on the whole the shortest stay in the hospital, and those subjected to tonsillectomy before entry had a somewhat longer period, but were not in the hospital as long as those cases who were operated upon during their stay. The difference between those operated on before entry and those not operated on at all is only slight, but those operated on in the hospital show a fairly wide divergence.

TABLE VIII.

DURATION OF HOSPITALIZATION.

Duration (days)	Operated Upon Before Admission		Operated Upon During Hospitalization		Not Operated Upon	
	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution	Number of Cases	Per Cent Distribution
15 or less	31	27.2	19	12.1	139	35.0
16-30	36	29.8	51	32.5	124	31.1
31-60	46	31.6	67	42.7	103	26.2
61	15	11.4	20	12.7	31	7.8
All Cases	114	100.	157	100.	397	100.

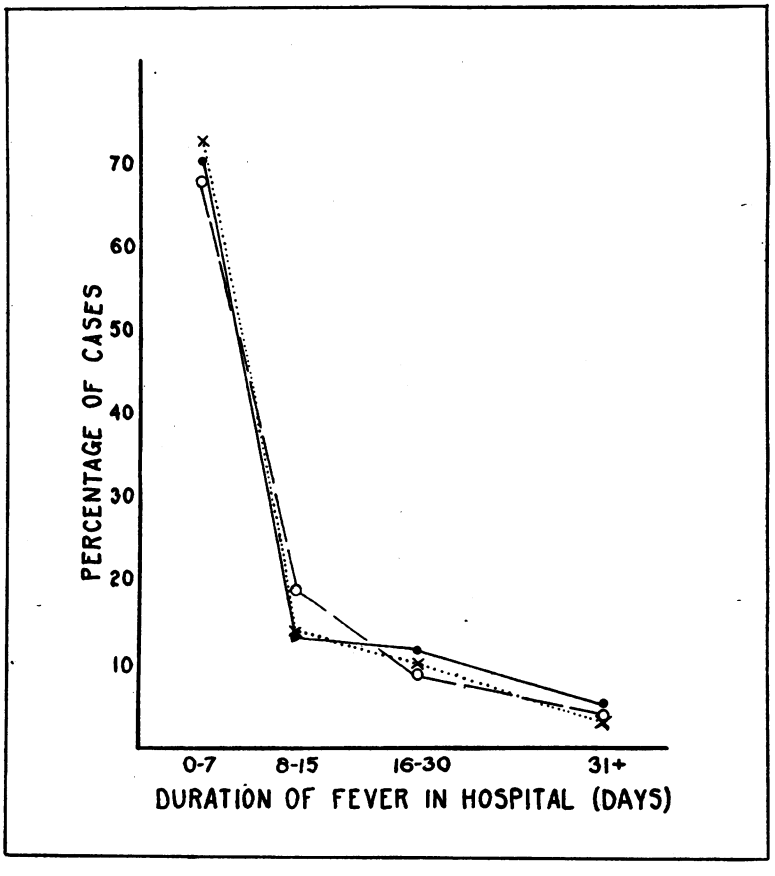

FIGURE 3.

●——————● Cases with tonsillectomy before admission.
O— — — — O Cases having tonsillectomy in hospital.
×·····× Cases without tonsillectomy.

Evidence of Active Rheumatic Heart Disease During Observation. Patients were considered to have active rheumatic heart disease when one of the following conditions was present: Changing endocardial murmurs; pericarditis; pancarditis; arrhythmias; disturbances of conduction; early accelerated pulse rate or decompensation. Among the 114 patients who had a tonsillectomy before entry, 33 or 29% had active rheumatic heart disease while under observation as compared to 104 or 19% of those cases who had no tonsillectomy before entry. When the latter cases are subdivided into those operated upon in the hospital and those having no operation at all, one finds that 21 or 15% of the 143 cases operated upon in the hospital and who were not previously subjected to tonsillectomy, were observed to have active rheumatic cardiac lesions, whereas 83 or 21% of the 397 cases who were at no time subjected to tonsillectomy had similar lesions. It is only fair to assume that the lowest figure of 15% among those cases operated upon in the hospital depends largely upon the choice of cases for operation, inasmuch as most of the physicians in the hospital have advised against operating upon patients in whom active lesions were observed. However, the high incidence of active rheumatic lesions in the group admitted to the hospital subsequent to tonsillectomy is striking. It must, of course, be considered that these cases may represent the poorer risks, inasmuch as patients having frequent attacks as shown above are more subject to rheumatic heart disease, and they are the ones usually recommended by physicians for tonsillectomy. When analyzed on the basis of the diagnosis of rheumatic heart disease at entry, it was seen that 93 or 34% of 269 patients having rheumatic heart disease at the time of entry showed active cardiac lesions during their stay, whereas 44 or 11% of those cases not diagnosed or suspected of having rheumatic heart disease at entry had active rheumatic cardiac lesions during their stay in the hospital. That is to say, according to the criterion mentioned, about one-third of the cases who were admitted with some rheumatic cardiac lesion were active during the attack for which they were admitted, whereas 11% of those not suspected of having any cardiac lesion at the time of entry developed evidence of lesions. Minor differences were observed between those cases operated on before entry and those not operated on.

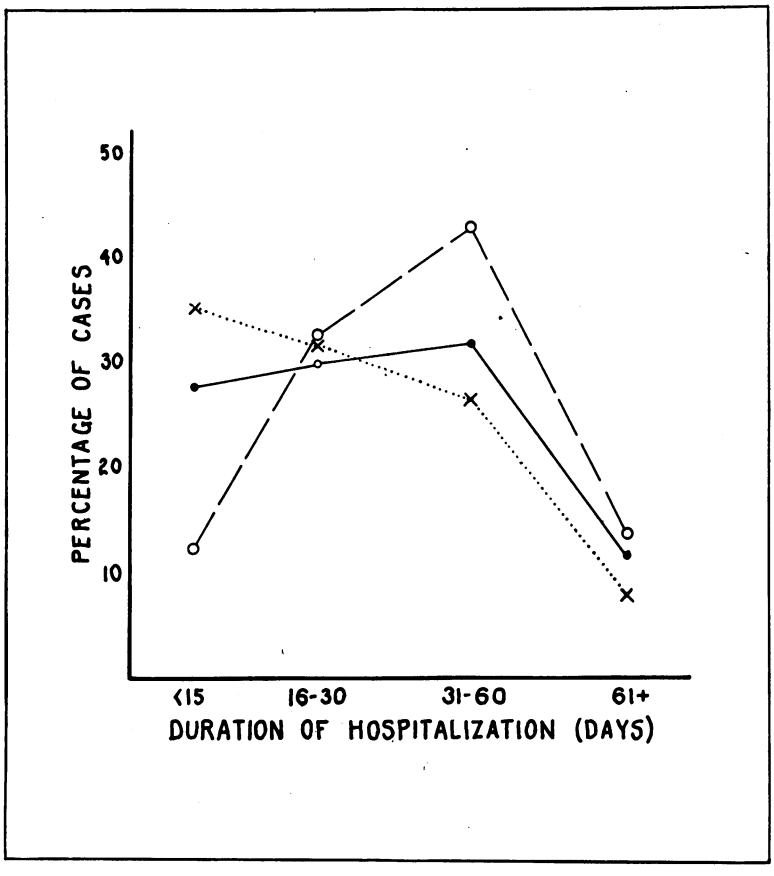

FIGURE 4.

●——————● Cases with tonsillectomy before admission.
O— — — —O Cases having tonsillectomy in hospital.
×·····× Cases without tonsillectomy.

Postoperative Complications. In Table IX are listed the number of cases in which various complications occurred among those who were operated upon in the hospital, excluding the patients whose operation was performed during the acute stage of the disease. Approximately one-half of the patients who were operated upon while apparently quiescent showed evidence of activity following the operation, but in only six were there serious complications as evidenced by the presence of active heart lesions following operation.

TABLE IX.

POSTOPERATIVE COMPLICATIONS.

(Cases operated on while symptoms of the acute disease were still present are excluded.)

Manifestations	Number of Cases
Leucocytosis, with or without fever	18
Fever, leucocytosis and active cardiac lesion	6
Fever and arthritis	21
Arthritis or nodules or both	4
Severe sore throat with fever	2
Peritonsillar abscess	1
Postoperative hemorrhage	3

INCIDENCE OF INITIAL ATTACKS AND RECURRENCES IN RELATION TO TONSILLECTOMY.

Age at First Attack. In Table X the cases are grouped according to the decade at which the first attack occurred. It is, of course, seen that except for the earliest age group, the incidence of initial attacks declines progressively with each decade. The 41 cases admitted for a first attack subsequent to the removal of their tonsils are also grouped by decades. The absence of cases beyond the age of 40 possibly depends upon the rarity with which older individuals are recommended for this operation rather than upon the frequency with which attacks tend to occur. The last column, indicating the patients who were admitted for an initial attack, again emphasizes the fact that although there is a progressive decline in incidence with each advancing decade, there are still a large number whose first observed attack occurs after the fourth decade.

TABLE X.

AGE AT TIME OF FIRST ATTACK OF POLYARTHRITIS.

Age at Time of First Attack	All Cases*	Cases Admitted for First Attack	
		With Previous Tonsillectomy	Without Previous Tonsillectomy
0-9	40	**	**
10-19	210	25	56
20-29	164	12	82
30-39	117	4	67
40-49	72	0	53
50 and over	33	0	21
Total	636	41	279

*Excluding 18 cases with incomplete data. In the subsequent tables the cases with insufficient data are excluded.
**No patients under 12 years are admitted to the medical service.

Frequency of Attacks. An attempt was made on the basis of the data obtained from the records to determine the frequency with which attacks occur according to the age at the onset of the disease, and also to determine the number of attacks in each of these age groups. The data for the cases not previously subjected to tonsillectomy are shown in Table XI. In general no marked differences are observed in the frequency with which attacks recur in the various age groups, although there appears to be some tendency for attacks to be further apart through the fourth decade, and then to be more frequent again in the later decades. The average number of recurrences is only very slightly lower in those having their initial attack in the later decades. In Table XII the results of a similar study in those cases previously subjected to tonsillectomy are given. Here it will be seen that the average number of recurrences in those cases admitted following tonsillectomy is about the same as those not previously operated upon. The attacks, however, are much closer together in the cases previously tonsillectomized. The attacks occurred on an average at the rate of one recurrence every 3.2 years in this group, as compared to one every 5.4 years in those not previously operated upon. It is interesting to observe that in the patients previously operated upon the average lapse from the time of tonsillectomy to the time of entry was 6.5 years and during this period there occurred an average of 2.0 attacks per patient. The frequency

of attacks following tonsillectomy is strikingly similar in these cases to the frequency of recurrences following the initial attack.

TABLE XI.

FREQUENCY OF ATTACKS IN CASES NOT PREVIOUSLY SUBJECTED TO TONSILLECTOMY.

Age at Initial Attack	Cases Admitted for Recurrence	Frequency of Recurrence*	Average Number of Attacks
0-9	23	4.7	4.0
10-19	90	5.6	3.1
20-29	58	5.7	2.8
30-39	41	6.8	2.5
40-49	18	4.5	2.9
50 and over	12	3.1	3.3
All Cases	242	5.4	3.0

*Average lapse, in years, between attacks.

TABLE XII.

FREQUENCY OF ATTACKS IN CASES PREVIOUSLY SUBJECTED TO TONSILLECTOMY.

Age at Initial Attack	Cases Admitted for Recurrence	Frequency of Recurrence	Average Number of Attacks	Frequency of Recurrence After Tonsillectomy	Average Number of Attacks After Tonsillectomy
0-9	16	4.2	3.4	3.8	2.1
10-19	37	2.9	3.1	2.9	2.1
20-29	11	4.7	2.5	3.9	1.8
30-39	5	2.1	2.4	2.4	1.2
40-49	1	0.7	4.	0.5	4.
50 and over	0	0.	0.	0.	0.
All Cases	70	3.2	3.1	3.2	2.

Sixty-five of the cases who were subjected to tonsillectomy before admission to the hospital were this time admitted for the first attack after their operation. Forty of these cases had had no attacks previously and 25 had attacks previous to their operation. The average lapse of time from the operation to the time of entry in those who had never had previous attacks was 6.4 years, and in the 25 cases now admitted for a recurrence—this being the first attack after the operation—the lapse from the time of tonsillectomy averaged 6.0 years. The figures are strikingly similar.

COMMENT.

The cases included in the analysis here presented were very carefully chosen in such a manner that no doubt can exist as to the type of cases admitted. No claim is made that all of these represent cases of rheumatic fever, and no attempt is made to enter into the controversy as to the differentiation of those cases of acute polyarthritis which may be included under the term rheumatic fever and those which should be designated acute infectious arthritis. Whether or not these cases should be so differentiated is of no great significance from the point of view of the material at hand. In the present study and from the material analyzed, such differentiation was well-nigh impossible.

The operation of tonsillectomy has been recommended and is being recommended for patients with rheumatic diseases by a large majority of physicians in face of a great amount of accumulated evidence tending to indicate that this operation has had very little or no demonstrable benefit upon the possibility of recurrences. The present data only confirm the previous work on this subject. It is further shown here that the individual attack is practically unaffected by the fact of previous removal of tonsils. The findings of more frequent attacks in patients previously subjected to tonsillectomy may, of course, have its basis in the fact that cases are recommended for tonsillectomy only when they are observed to have frequent attacks, and the longer duration of joint symptoms, as well as the long duration of hospitalization, as has already been inferred, is probably due to the number of cases having slight recurrences following the operation and who are kept in the hospital a somewhat longer period in order to be observed following their operation.

On the basis of the frequent observation of sore throats preceding rheumatic manifestations, as intimated in the findings recorded, it would seem that removal of tonsils should eradicate an important focus of infection and thus decrease the possibilities of recurrences. In individual cases, apparently striking benefit is observed even when the tonsils are enucleated during the active disease, but obviously this is not always the case. The explanation for the poor results following operation is not entirely clear. We have mentioned above that about one-half of the operated cases were recorded as having tonsillar tissue at the time of admission. It is possible that incomplete re-

moval of tonsils may be harmful, as the infected focus may become buried in scar tissue following the operation. Other foci may be overlooked or inaccessible.

Summary and Conclusions.

The case records of 654 consecutive patients admitted to the Boston City Hospital for acute migratory polyarthritis were studied for the purpose of determining whether or not tonsillectomy has altered the course of the attack or has affected the frequency of recurrence.

Patients admitted to the hospital for acute polyarthritis who had been operated upon sometime previously had on the whole a very similar course in the hospital, as judged by the duration of joint symptoms, the duration of fever, and the duration of hospitalization.

Patients subjected to tonsillectomy during their stay in the hospital for acute migratory polyarthritis had a slightly longer period of joint symptoms and of hospitalization than those not operated upon during their stay.

Tonsillectomy has had very little influence in these cases upon the frequency of recurrent attacks.

Finally, what deductions shall we make from this investigation? In a large series of cases, such as have been reported here and in other studies, it must be remembered that a great number of operators of varying degrees of experience is represented. It is a question whether such large groups of cases gathered in this manner from the records of a large municipal hospital give a true estimate of tonsillectomy as a preventive of rheumatic fever. In private practice where the case can be studied with great care and an operator of experience in this particular operation can be selected, the results are often far more satisfactory. One of the authors, after years of private practice, feels that when this has been done, the procedure has often been highly justifiable and has fully accomplished its aim.

DISCUSSION.

Dr. Joseph S. Pratt: This brings up for consideration the question of the diagnosis of chronic tonsillitis. I have talked with various laryngologists, and I have read some of the standard texts, and there is no agreement as to the data or findings that are necessary in order to make a diagnosis of chronic tonsillitis.

In Germany, especially in the Würzburg clinic, where the subject of the relation of chronic tonsillitis to general disease has been considered, they have depended largely upon the presence of a considerable number of pus cells in the smears made from the exudate in the crypts.

Personally, that impresses me as a procedure that should be done in all cases. Of course it has been shown that the presence of bacteria has no significance—that is, the presence of streptococci or other organisms—except the possibility that if you find hemolyticus, that may indicate the presence of an infection in which absorption may occur.

Dr. Lonko told me that in a study made of patients under his care, streptococcus hemolyticus was found in only about 7 per cent of the cases, but in the cases that he had with nephritis I think the percentage was about 70 per cent. That being the case, it would seem to be justifiable to remove the tonsils in those cases, but how about the other conditions? Should we depend upon the demonstration of pus in the crypts or are there other signs of value? Some lay great stress on the presence of tender lymph nodes at the angle of the jaw. That would seem to me to be even of more value than a bacteriological demonstration or the mere demonstration of pus in the crypts, because we may have a small amount of purulent exudate there, and there may be little or no absorption.

I find that the average laryngologist sees a damaged tonsil every time he looks into a patient's throat. I think we should spend a good deal more time and attention on this problem of the diagnosis of these tonsils, and I would like to have Dr. Robey's opinion or his criteria for a diagnosis for a defective tonsil, or a tonsil that is causing constitutional symptoms.

DR. HARRY LEE BARNES: Dr. Robey told us that some cases of tonsillectomy were well done in his series and some were poorly done. I would like to ask if he separated these statistics and whether he has any tabulation showing the post-operative results in those who had a proper tonsillectomy.

PRESIDENT HAMMAN: Dr. Robey's figures are extremely interesting to me. Everybody has a feeling that there is a strong relation between tonsillar infection and rheumatic fever, and the general impression that many cases are benefited by tonsillectomy is not without a certain degree of value. But when you look for statistical evidence proving first that children who have had their tonsils removed have a smaller incidence of rheumatic fever than children in the same group whose tonsils have not been removed, or secondly, if you hunt for evidence to show that children who have had one attack of rheumatic fever have fewer subsequent attacks if the tonsils are removed than in a similar group where the tonsils have not been removed, it is impossible to find definite evidence to prove those views.

I should like to ask Dr. Robey if his cases include only cases of genuine rheumatic fever, or whether they also include cases of polyarthritis that belong in the group that is commonly spoken of as infectious arthritis. If these are all

cases of rheumatic fever, the age distribution is certainly very unusual because over 50 per cent of the cases are between 20 and 40 years of age.

DR. ROBEY: Dr. Pratt's question is one that I thought he or somebody else would ask. When I gave our paper on the effect of tonsillectomy on acute rheumatic fever that is the question that Dr. Cecil asked me, and it is a very difficult one to answer.

I agree with you that this subject is not one to be much discussed by laryngologists. I don't think their opinion can be compared with that of the physician in value, and it is one reason why some of us have not hesitated to talk about this subject, because it is a tonsillar disease. There is the operative treatment, of course, but it is up to us to decide just how and when tonsils should be taken out.

I will say, however, that I have sent cases to laryngologists and they have refused to take out the tonsils because they could see no infection. One of our best men removed tonsils from a woman who had recurring attacks of arthritis. He did it only because I insisted, and he wrote me later and said that he was very glad that he did because the right tonsil contained considerable pus which he was unable to detect on ordinary examination.

There has been a great deal said about the presence of pus, the ability to express pus from the tonsil either by pressing on it with a small instrument or using the suction pump. Some of our friends in Boston, when they do that, say they don't know whether it is pus or not, that it is some kind of exudate, but may not be purulent. That, I think, is of very little value.

As to finding the hemolyticus in the tonsil, I think that has been done, but there are cases that would never have had any trouble even if the hemolyticus was in the tonsil. Of course we do know that many of these other cases have a virulent hemolyticus, but I mean it does not help us enough to be a guide.

I think the point about the glands, Dr. Pratt, is very important. I believe that even with very innocent looking tonsils, if you are getting glands about the angle of the jaw which come and go, which are sometimes a little tender, that should be a point that would be a very distinct guide toward operation.

As to the results of tonsillectomy in those cases which you spoke of, Doctor, as being well done, I am sorry to say that all of this work was built up on hospital records over a period of about five years, and many of these cases we could not get back. The only point that I tried to bring out about it was that it is a major operation and it can't be done by everybody, and yet, as you know, every general practitioner does a tonsillectomy without any hesitation. He considers it a part of his regular work, and of course he sometimes takes out too much, which is a bad thing because that interferes with the normal circulation of the throat; but more often he does not get out enough. Then I believe that he takes out a lot of tonsils that probably don't have to come out and perhaps causes trouble in that way.

We tried not to include, Dr. Hamman, in this group, any of the cases of infectious arthritis. However, that, from hospital records, sometimes is a little

difficult to do. We tried to select only cases that seemed to have acute polyarthritis.

If I may take just one minute more, I would like to mention the case of a young man, the brother of one of our surgeons in Boston, who was several weeks in the Phillips House with polyarthritis. He had no cardiac involvement. He was given all the medical treatment, silicylates in various forms and combinations, rest and applications, and the disease would quiet down for three or four days and they would think they were reaching a conclusion, and then it would flare up again just as did our cases in the City Hospital. There was a great deal of discussion as to whether the tonsils should come out or not. Three laryngologists saw this young man, and finally the tonsils were enucleated. That is nearly two years ago now. The young man was practically well in a week and he has not had the slightest trouble since. Two years is too short a period to come to any definite conclusion. As to what may happen to him later is another matter, but certainly the result justified what they felt was a strenuous measure.